1964 ANNUAL INDEX

tool & manufacturing engineer

SECTION ONE AUTHOR INDEX VOLUMES 52 and 53

—A—

Achler, Howard S.—Low-cost Forming Dies, June p. 73
Addison, H. J. Jr.—Explosive Welding,* Oct. p. 136
Anderson, L.—Fixture Designed for Turning Tenons,* Mar. p. 83.
Good Design for Indexing Pawls,* Dec. p 52
Spring Steel Holds Parallels Erect,* Nov. p. 48
Arleth, Gustav A.—Lathe Turning of Punch Cuts Machining Time,* June p. 68

—B—

Babcock, Bruce E.—Indexing Welding Fixture for Parts of Different Size,* May p. 65
Bardach, M.—Adjustable Lap for Sizing Reamers,* Mar. p. 83
Barnes, E. C. and R. F. Woll, J. A. Kutz and A. A. Morris—Electric Motor Ratings,* Oct. p. 135
Becker, R. C.—Production Welding,* June p. 167
Benson, Jack—Bend Allowance Calculations for Sheet Metal Parts, Dec. p. 53
Benton, Rufus R. C. and G. Daniel Woodring—Chemical Blanking: What It Is, What It Can Do, May p. 87
Black, T. W.—Explosive Forming of Thin-Wall Tubing, Sept. p. 59
Machine Straightens Blanked Parts, Feb. p. 78
Numerical Control—State of the Art and Future Developments, Jan. p. 53
Skate Tool Machines Massive Forming Die, Apr. p. 113
Thin-Film Microcircuits: What They Are, How They're Made, May p. 77
Vibratory Finishing Goes Automatic, July p. 53
Vibratory Finishing Goes Automatic, Aug. p. 72
Bodger, W. K.—Bearing Supports,* July p. 110
Bourdeau, R. B.—Vapor Deposition,* Aug. p. 558
Brinkman, T. H.—Embossing, Dec. p. 63
Brockrath, G. E. and S. R. Valluri and J. B. Glasco—Crack Propagation,* June p. 167
Brooks, Allan—How to Evaluate and Inspect Retaining Rings, Mar. p. 89
Brooks, Charles L.—Machine Inserts Transistors—Wraps Leads, Apr. p. 96
Brown, K. W.—Factors in Make-or-Buy,* Mar. p. 199
Bruce, W. R.—Meeting the Challenge of Change Through Engineering Education, Apr. p. 81
Bulow C. L.—Resistance Welding of Copper Alloys, May p. 91
Burkhardt, C. E. and B. B. Ellis—Step-Lap Joints in Lamination Stacks, Oct. p. 63

—C—

Carlson, H.—Tooling Solves Difficult Bending Problem, Apr. p. 107
Chambers, Arthur E.—Forming Grinding of Carbides—EDM Versus Diamond Wheel, Apr. p. 93
Ciscle, William T., Jr.—D-Dies Made with Inserts,* Mar. p. 81
Clark, S. K.—Testing of Bolts,* Sept. p. 139
Coch, B. Michael—Fixture Solves a Drilling Problem,* Jan. p. 48
Connell, E. A. and I. J. Doell—Four-Slide Forming for Speed and Economy, Jan. p. 51
Connolly, W. F. —Servos for N/C Machines,* Apr. p. 295
Cotter, Jack, Chris Hansen and Richard Tomasulo—New Solution to a Tube Welding Problem, Feb. p. 85
Czelowalnik, A. and R. L. Guerin—Spark Drilling,* Nov. p. 126

—D—

Dallas, Daniel B.—Automated Job Shop—The Computer Lends a Hand, Mar. p. 77
Transfer Dies Solve Manufacturing Problems, Dec. p. 55
D'Angelo, D.—Four-Slide Press Capacity, Nov. p. 67
Delmonte, John—Low-Density Foams for Nonmetallic Tooling, Sept. p. 71
Devine, J. B.—Stretching for Space—Segments for Saturn, May p. 61
Write Better Reports, Sept. p. 73
Dobson, D. B.—Automatic Testing,* Oct. p. 135
Doell, I. J. and E. A. Connell—Four-Slide Forming for Speed and Economy, Jan. p. 51
Dressler, R. A.—Notch Step Shortens Progressive Die,* Nov. p. 50
Dullberg, E. and C. Vanderhoof—Liquid Nitrogen Quenches Without Distortion, May p. 71
Dyer, H. B.—Diamonds for Metal Bond,* Aug. p. 556

—E—

Egras, D., Edwardo—Pressless Die for Short-Run Piercing,* Jan. p. 50
Eldridge, W. Russell—Contour Bushing Solves Off-Center Hole Problem,* Oct. p. 50
Prestressed Fixture Reduces Vibration,* Sept. p. 51
Tool Inserts Flanged Parts Into Rubber, Aug.* p. 69
Ellis, B. B. and C. E. Burkhardt—Step-Lap Joints in Lamination Stacks, Oct. p. 63
Esken, R. L.—Evaluating Performance of Automatic Gaging Machines, Mar. p. 85
Esperschade, P. W. and *C. D. Wood*—Dust Erosion,* Dec. p. 133
Extermanis, J. A. and W. Pentland—Ultrasonic Machining,* Nov. p. 126

—F—

Faltersack, Fred P.—Lapping Setup Trues Chuck Jaws,* July p. 49
Fasser, Walter B.—Cold Swaging of Bores, Nov. p. 57
Faulkner, G. E. and W. J. Lewis and D. C. Martin—Welding Thick Titanium Plate,* June p. 168
Feinberg, Bernard—Abrasive Belt Grinding—A Consideration for Low Unit Cost Productivity, Mar. p. 109
Fisher, R. C.—Abrasive Machining,* Sept. p. 140
Fitzpatrick, Paul—Efficient Parts Handling—Key to Lower Costs, May p. 67
Foster, Donald G.—Computer-Programmed Press, Sept. p. 57
Fox, Donald K.—Superconductors—How They Work, How They're Made, Sept. p. 47
Franko, F. M.—Double Flycutter for Finishing Castings,* Feb. p. 63
Franks, J. R.—Tooling the Saturn Rocket, July p. 51
Frederick, E.—Jaws Level and Hold Castings,* July p. 49

—G—

Gajda, L. P.—Arc Welding for Prototype Production, June p. 77
Galimberti, James M.—Longer-Life Carbides Improve Tool Performance, Apr. p. 98
Gerber, H. J.—Arbor Flanges Have Many Uses,* Nov. p. 49
Bronze Bushing Protects Reamer,* Apr. p. 84
Diehead Is Mounted on Engine Lathe,* Dec. p. 51
Double Cutters Speed Rack Milling,* Sept. p. 51
Transfer Jig Speeds Small-Lot Production,* May p. 64
Gibbons, C.—Adapter Solves Screw-Holding Problem,* Feb. p. 65
Giles, Darrel—Rubber Patterns Make Intricate Castings, July p. 69
Gillen, S.—Automobile Batteries,* June p. 110
Giordano, Felix M.—Grinding Boron Carbides, July p. 57
Improving Machine Capability, June p. 65
New Developments in Threaded Fasteners, Part I—Root Profile, Jan. p. 65
New Developments in Threaded Fasteners, Part II—Clamp Loading, Feb. p. 66
Soft Nitriding, Apr. p. 121
Glasco, J. B. and G. E. Brockrath and S. R. Valluri—Crack Propagation,* June p. 167
Gould, Robert—Vacuum Fixture Holds Nonmagnetic Materials,* Aug. p. 71
Greenman, Morgan A.—Drill Fixture for Hole Series in Shaft,* Oct. p. 50
Greve, John W.—Dependability and Precision Are Featured in Italian Tools, Dec. p. 45
Gross, Hugo A.—Transfer Punch Fits Different Holes,* Dec. p. 51
Groth, Glenn A.—Special Tool Fits Boring Slot,* Aug. p. 69
Guerin, R. L. and A. Czelowalnik—Spark Drilling,* Nov. p. 126
Gupta, K. N.—Taps Make Good Bushing Removers,* Feb. p. 63
V-Block Fixture for Central Holes,* Apr. p. 86

—H—

Haggerty, W. Andrew—ECM Process Parameters,* Feb. p. 163
Hamilton, K. W.—Valve Solves Hydroform Ventage Problem,* Sept. p. 52
Hanneman, W. M.—Plastic Fasteners,* Aug. p. 557
Hansen, Chris, Richard Tomasulo and Jack Cotter—New Solution to a Tube Welding Problem, Feb. p. 85

*Brief article of less than one page.

Harland, P.—Trends in Pressure Gages,* Aug. p. 555
Haugk, Charles A.—Shaft Has Slow, Accurately Controlled Rate of Advance,* Oct. p. 50
Heinmiller, P. R.—Putting Ideas Into Action Through Better Communications, Jan. p. 45
Hill, Robert D. J.—Roller Chain Fixture Holds Irregularly Shaped Work,* Dec. p. 50
Hollander, M. B. and J. A. Quimby—Friction Welding,* Sept. p. 142
Howsam, Charles W.—Flush-Pin Gage Is Designed for Circular Recesses,* June p. 70
Hurtubise, D.—New Magnesium Alloy,* July p. 109
Hutsley, Floyd A.—Ejector Removes Parts at Stroke Bottom,* Aug. p. 70

—I—

Incardona, A. and H. Poett—Cryothermal Treatment for Aluminum, Sept. p. 66.
Isetts, Roger—Clamp Assembly Holds Large Castings,* Jan. p. 48
Deburring Unit Increases Operator Efficiency,* Feb. p. 65
Simplifies Step Drill Sharpening,* Nov. p. 48
Stop Speeds Setups,* Apr. p. 84
Iyengar, H. S. Rama, R. Salmon and *W. B. Rice*—How Cutting Fluids Affect Chip Characteristics,* Dec. p. 135

—J—

Jorgensen, S. M.—Expansion Process Forms Thick-Walled Cylinders, Dec. p. 67

—K—

Kaera, Kaarel—Gage Checks Size and Corner Squareness,* Aug. p. 71
Kapernaros, E. L.—Diamond Content and Grinding Wheel Performance,* Aug. p. 556
Kaplan, Stanley E.—Tool Mounts Plastic Grips on Handles,* June p. 68
Kimberling, D. F.—Altered C-Clamps Speed Machine Clamping,* June p. 70
Altered Vise Holds Tapered Blocks,* May p. 64
Center Plate Speeds Off-Center Machining,* Aug. p. 70
Laminated Mandrel for Oval Springs,* Sept. p. 51
Lathe Fixture for Eccentric Turning,* July p. 48
Modified Drill Bushing Improves Coolant Flow,* Apr. p. 84
Kleiner, W. B. and F. A. Pitschke—ECM Tooling and Controls,* Sept. p. 139
Knapp, Franklin H.—Adjustable Jig Gives Fast Short-Run Setups,* Apr. p. 86
Kollmorgen, Loran L.—How to Bend Titanium Tubing, Apr. p. 90
Kotora, James, Jr. and Daniel Strack—Electrode Machines Precision Slits, Oct. p. 51
Kutz, J. A. and A. A. Morris, E. C. Barnes and R. F. Woll—Electric Motor Ratings,* Oct. p. 135

—L—

Landstrom, R. E.—Gear Hones Selection and Use, Mar. p. 97
Laurito, Anthony D.—VE Job Plan Eliminates Excessive Costs, Feb. p. 61
Lewis, W. J. and G. E. Faulkner and D. C. Martin—Welding Thick Titanium Plate,* June p. 168
Luchner, H.—Drive Doges for Delicate Parts,* July p. 48
Lutman, B. O.—Adjustable Speed Drives with SCR Conversion Units,* Aug. p. 555

—M—

Maple, J. D.—Sine Plate Has Sine-Bar Edges,* Feb. p. 63
Marsden, William F.—Filing and Finding Information, June p. 89
Marsh, Roger—Progressive Operations Accomplished in Short-Run Die,* Jan. p. 49
Marshall, A. C.—Honeycomb in Plastic Tooling, Jan. p. 75
Martin, D. C. and G. E. Faulkner, and W. J. Lewis—Welding Thick Titanium Plate,* June p. 168
Max Abraham M.—Aesthetic Values of Finishes,* Feb. p. 164
Mayer, Fred—Stacked Broaches Permit Individual Clamping,* Oct. p. 49
Mertz, R. L. —Adaptive Control,* Jan. p. 157
Meshulam, Avram M.—Toggle Mechanism Cuts Sheet Stock,* June p. 69
Miccio, Frank—Special Bushing Helps In Removing Milling Machine Arbors,* July p. 50
Mikulak, John—Weld Design,* Mar. p. 199
Miller, H. C.—Testing Resin Bonded Diamond Wheels,* Mar. p. 199
Moran, Ronald W.—How to Specify Tolerances for Precision Bearings, Jan. p. 69
Morris, A. A. and E. C. Barnes, and R. F. Woll, and J. A. Kutz—Electric Motor Ratings,* Oct. p. 135
Morrisroe, G. L.—NAMDA—New Formula for Management Control, Oct. p. 45

Moshe, Harari—Shimmy Die Finishes End of Shells,* Mar. p. 84
Mostovoy, S., E. J. Ripling and R. L. Patrick—Adhesive Joint Toughness,* Apr. p. 297
Muntendam, J. and A. F. van Heuven—Low-Cost Blanking Dies Produce High-Quality Parts, Feb. p. 69
Murphy, W. J.—Microstructure of Steel, Aug. p. 80

—Mc—

McCarty, R. C.—NC Programming from Undimensioned Drawings, Oct. p. 69
McDonell, R. F.—Aluminized Steel, Nov. p. 52
McLaughlin, Clint—Articulated Tool Permits Lathe to Mill Flats,* Nov. p. 49
Lathe Turret Is Adapted to Milling Machine,* p. 81
Thrust Bearing Aid in Bushing Assembly,* Dec. p. 50
McLaughlin, William O.—Centerhead Increases Capabilities of Conventional Center,* Feb. p. 65
McNeil, Paul—Hydraulic Removal of Bushings,* July p. 48

—O—

O'Neal, R. R.—Milling Fixture for Large Diameters,* July p. 50
Opel, W. R.—Special Machines Fill Many Needs, Oct. p. 59
Owkzarski, W. A.—Diffusion Welding,* Aug. p. 558

—P—

Parker, D.—Inverted Setup for Deep-Hole Drilling,* Feb. p. 64
Ratcheting Tapholder Cuts Tap Breakage,* Mar. p. 82
Recesses Are Machined on Drill Press,* Oct. p. 49
Workpiece Rides Air Cushion,* Jan. p. 50
Patch, J. B.—Heat Treating Alumina,* Jan. p. 157
Patrick, R. L., E. J. Ripling and S. Mostovov—Adhesive Joint Toughness,* Apr. p. 297
Payne, William S.—Cut Tooling Costs with Master Standard Fixtures, Jan. p. 63
Pentland, W. and J. A. Ektermanis—Ultrasonic Machining,* Nov. p. 126
Pickrell, A. L.—Numerically Controlled Die-sinking, June p. 85
Pitschke, F. A. and W. B. Kleiner—ECM Tooling and Controls,* Sept. p. 139
Poett, H. and A. Incardona—Cryothermal Treatment for Aluminum, Sept. p. 66
Price, J. E.—Crush Grading of Grinding Wheels, Jan. p. 78
Pridgeaux, D. G.—Spray Layup of Plastic Tooling, Apr. p. 87

—Q—

Quimby, J. A. and M. B. Hollander—Friction Welding,* Sept. p. 142
Quinn, W. J.—How Clearances Vary with Temperature, Apr. p. 125

—R—

Radke, Lee and L. H. Smith—Automation Comes to Diecasting Sept. p. 53
Ratterman, E.—Diamonds Grind Carbides, June p. 81
Rice, W. B., H. S. Rama Iyengar and *R. Salmon*—How Cutting Fluids Affect Chip Characteristics,* Dec. p. 135
Ripling, E. J., S. Mostovov and R. L. Patrick—Adhesive Joint Toughness,* Apr. p. 297
Rockenfelder, Don—Numerical Control Pays Off in Short-Run production, Oct. p. 71
Rodes, H. P.—Educating Engineers for Industry, July p. 45
Roth, E. S.— Gaging by MMC, Nov. p. 70
Rudy, J. F.—Unusual Welding Processes,* May p. 159
Rush, F. L.—Arbor-Press Die Cuts Keyways Accurately,* Apr. p. 85
Bore Gage Fits Many Parts,* Feb. p. 64
Fixture Speeds Die Button Grinding,* May p. 64
Manually Operated Die Forms Intricate Parts,* June p. 70
Welding Fixture Fabricated from Angle Iron,* Jan. p. 49
Rylander, A. E.—Dial Feeder Has Cushioned Starts and Stops,* Nov. p. 50

—S—

Salmon, R., H. S. Rama Iyengar and *W. B. Rice*—How Cutting Fluids Affect Chip Characteristics,* Dec. p. 135
Schlager, K. J.—Industrial Dynamics,* July p. 109
Schwartz, Mel M. and *Michael E. Wasilisin*—On the Power Horizon: Thermionic Converters, Dec. p. 73
Scott, G. W.—Arc Welding of Copper, Aug. p. 85
Seiler, Harry—Knotting Device for Strain Wire,* Apr. p. 85
Sims, Wayne F.—Adjustable Scriber Speeds Die Layout,* Jan. p. 50
Singh, Inder Jeet—Spring Winder for Prototype Work,* Apr. p. 86
Universal Die for Short-Run Draws,* Dec. p. 50
Sjostedt, William E.—Drill Chucks Used as Fixture Components,* Aug. p. 69
Grinding Fixture for Ball-Nose Cutters,* Nov. p. 48
Roll Forming on a Drill Press,* June p. 69
Smith, L. H. and Lee Radke—Automation Comes to Diecasting, Sept. p. 53
Smith, Leonard I.—Diamond Wheel Economics,* Mar. p. 200
Souler, R. A.—Gaging with Air,* Nov. p. 125
Springer, Vernon—Fixture Permits Easy Part Removal,* Sept. p. 52
Stephenson, W. B., Jr.—Electrodeposition,* Dec. p. 134
Strack, Daniel and James Kotora, Jr.—Electrode Machines Precision Slits, Oct. p. 51
Strasser, Federico—Die Makes Double Right-Angle Bend,* Jan. p. 49
Trigger Stop Functions on Thin Stock,* Mar. p. 83
Stross, Hans A.—Faceplate Fixture Is Hydraulically Actuated,* Mar. p. 82

—T—

Taub, S.—Putting VE to Work, Nov. p. 45
Tanner, O. G. and *Yu Sh. Zbarskii*—Accurate Positioning in NC Machine Tools, Dec. p. 116
Terrill, C. E.—Automotive Body Fasteners,* Dec. p. 133
Tinsdale, G. R.—Clamp Holds Parts for Welding,* May p. 66
Tomasulo, Richard, Jack Cotter and Chris Hansen—New Solution to a Tube Welding Problem, Feb. p. 85
Trott, L. L.—Electrolytic Grinding Finishes Microminiature Parts, Jan. p. 81
Trucks, H. E.—Design for Value!, Aug. p. 65
Tunwall, John W.—Chemical Milling, Nov. p. 61

—V—

Vajda, T. F.—Welding Speeds Construction of Special Machines, Nov. p. 51
Valluri, S. R. and J. B. Glasco and G. E. Brockrath—Crack Propagation,* June p. 167
Van de Houten, J. R.—Measurement Accuracy,* May p. 159
van der Burgt, J. H.—Progressive Dies Make Miniaturized Parts, Oct. p. 53
van Heuven, A. F. and J. Muntendam—Low-Cost Blanking Dies Produce High-Quality Parts, Feb. p. 69
Vande Walle, A. C.—Novel Cam Rider Eliminates Toolmarks,* May p. 66
Vanderhoof, C. and E. Dullberg—Liquid Nitrogen Quenches Without Distortion, May p. 71

—W—

Wasilisin, Michael and *Mel M. Schwartz*—on the Power Horizon: Thermionic Converters, Dec. p. 73
Weigel, David L.—Minimizing Fatigue Failure, Nov. p. 71
Weiner, Max—V-Block Has Special Clamp,* Aug. p. 70
Magnetic Angle Plate Has Fast Adjustment,* Sept. p. 52
Weisman, David—How Temperature Variations Affect Accuracy, Feb. p. 91
Wiatt, J. G.—Gaging for Automation,*Jan. p. 158
Williams, Andrew W.—Thread Milling of Tapered Screws, Feb. p. 97
Wilson, W. A.—Hardness Measured on the Run,* Apr. p. 295
Winquist, Karl E.—Fast-Acting Assembly Tool,* May p. 65
Wishing, Eugene M.—Versatile Tube Bender, July p. 63
Woll, R. F. and J. A. Kutz, A. A. Morris and E. C. Barnes—Electric Motor Ratings,* Oct. p. 135
Wood, C. D. and *P. W. Espenschade*—Dust Erosion,* Dec. p. 133
Woodring, G. Daniel and Rufus R. C. Benton—Chemical Blanking: What It Is, What It Can Do, May p. 87
Wolak, A. F.—Dynamically Balanced Boring Bar Cuts Vibration,* July p. 50

—Y—

Yablonski, A.—Machining Without Distortion,* Aug. p. 557
Yares, B.—Winder Can Be Used in Drill Presses,* Dec. p. 52
Yoder, Frank, Jr.—Special Burnishing Tool Finishes Spherical Surfaces,* Aug. p. 71

—Z—

Zbarskii, Yu. Sh. and *O. G. Tanner*—Accurate Positioning in NC Machine Tools, Dec. p. 116
Zhitnitskii, S. I.—Carbide Broach,* Dec. p. 116

*Brief article of less than one page.

SECTION TWO SUBJECT INDEX VOLUMES 52 and 53

—A—

APT language, June p. 85, Aug. p. 82
Abrasive, belt grinding, Mar. p. 109
gas-blown, May p. 86
machining,* Sept. p. 140
Accelerometers, calibration of, Sept. p. 56
Acceptable Quality Levels, Apr. p. 127
Acceptance numbers for AQLs, Apr. p. 127
Accuracy in measurement,* May p. 159
Adaptive control for resistance welding,* Sept. p. 116
Adaptive control,* Jan. p. 157, Apr. p. 119
(See also Computers)
Adhesive joint toughness,* Apr. p. 297
Adjustable jig,* Apr. p. 86
Adjustable lap for sizing reamers,* Mar. p. 83
Adjustable stroke cam,* Apr. 117
Aerospace components,* Mar. p. 88
Aging, ultrasonic,* May p. 154
Air cushion, use of in workpiece support,* Jan. p. 50
Air gaging,* Nov. p. 125
Alloys (See also Steel)
copper, May p. 91
ferrous, nitriding of, Apr. p. 121
magnesium,* July p. 109
measuring magnetic properties of,* Apr. p. 180
Altered vice,* May p. 64
Alumina, grinding of, Nov. p. 65
heat treating,* Jan. p. 157
Aluminized steel, Nov. p. 52
Aluminum, submarine hull sections, June p. 87
component parts, chemical milling of, Nov. p. 61
forgings stablilized by cryothermal treatment, Sept. p. 66
machining, affects of temperature variations, Feb. p. 91
sheet metal, Apr. p. 71
Aluminum, solder for brazing,* June p. 139
American Standard on Unified Screw Threads, Jan. p. 66
Angle plate, magnetic,* Sept. p. 52
Aperture cards, June p. 89
Arbor flanges, use of,* Nov. p. 49
Arbor press die,* Apr. p. 85
Arc-air machining,* Aug. p. 547
Arc welding, June p. 77, Aug. 85
Articulated lathe spindle,* Sept. p. 63
Articulated tool,* Nov. p. 49
Artwork for chemical blanking, May p. 87
Assembly, automatic, Apr. p. 96
machine for transistors, Apr. p. 96
magnetic,* Mar. p. 186
paint, Sept. p. 64
selective, precision bearings, Jan. p. 70
tool, fast acting,* May p. 65
tooling, Apr. p. 96
Attrition, a cause of tool wear, Apr. p. 99
Automated vibratory finishing, Aug. p. 72
Automatic, arc welding, May p. 84
assembly, Apr. p. 96
bar, Mar. p. 96
chucking machine, Oct. p. 57
data processing, Mar. p. 78
feeding and threading, Mar. 95
gaging machines, evaluating performance of, Mar. p. 85
parts handling, May p. 67
testing,* Oct. p. 135
Automation, Mar. p. 77, Mar. p. 105
gaging for,* Jan. p. 158
in diecasting, Sept. p. 53
Automobile batteries,* July p. 110
Autoprogrammer, Oct. p. 65

—B—

Ball-nose cutters, grinding fixture for,* Nov. p. 48
Ball tracks, honing of, Jan. p. 60
Bars, round, bending of, May p. 81
Batteries, automobile,* July p. 110
Bearinig, race feeding, May p. 67
resin bonded,* Apr. p. 271
supports,* July p. 110
Bend allowance calculations, Dec. p. 53
Bending, copper alloy tubes, Aug. p. 91
machine, numerically controlled, Feb. p. 75
of round bars, May p. 81
operations, Apr. p. 107
speeds, titanium tubing, Apr. p. 92
Blank straightening machine, Feb. p. 78
Blanking, chemical, May p. 87
dies, low-cost, Feb. p. 69
operations, chemical, May p. 87
Bolts, electromagnetic handling of,* Nov. p. 108
Bolts, testing of,* Sept. p. 139
Bonded guideways,* Nov. p. 107
Bore gage,* Feb. p. 64
Bores, cold swaging of, Nov. p. 57
Boring, bar, dynamically balanced,* July p. 50
bar vibration,* Sept. p. 112
machine mills undulating grooves, Sept. p. 62
tool,* Aug. p. 69
Boron carbide, grinding of, July p. 57
Brazing aluminized steel, Nov. p. 55
of thermionic converters, Dec. p. 76
Brittle superconductors, Sept. p. 48
Broach, carbide,* Dec. p. 116
Broaches, stacked,* Oct. p. 49
Broaching,* July p. 62, Oct. p. 49
cast iron,* July p. 101
helicopter spars, Apr. p. 118
mist lubrication for,* July p. 102
temperature,* July p. 99
Bronze, welding characteristics of, May p. 91
Building block construction, Dec. p. 62
Building-block numerical control systems, Jan. p. 59
Bulge forming, May p. 61
Bulging dies, urethane, June p. 76
Burning of work during grinding, Dec. p. 77
electromechanical,* Sept. p. 114
pulse,* Nov. p. 109
tool,* Aug. p. 71
Bushing assembly,* Dec. p. 50
Bushing, contour,* Oct. p. 50
inserter,* Aug. p. 69
removal,* July p. 48
remover,* Feb. p. 63
Butt, spot, and seam welding, May p. 91
Buttress threads, Feb. p. 97

—C—

C-clamps, altered, June p. 70
Calculations, bend-allowance, Dec. p. 53
Cam, adjustable-stroke, Apr. p. 117
Cam milling, Dec. p. 71
Capability analysis, June p. 65
Carbide, broach,* Dec. p. 116
broaches, wear of in broaching cast iron,* July p. 101
cutting tools, Apr. p. 98
grades, Apr. p. 101
grinding, Apr. p. 93
tooling, Apr. p. 105, Jan. p. 74*
tools, testing,* June p. 157, Aug. p. 544*
use of in peeling machines,* Oct. p. 108
Carbides, diamond grinding of, June p. 81
effect of on tool performance, Apr. p. 98
steel bonded, Mar. p. 115
Carbon steel, nitriding, Apr. p. 121
Cartridge brass, welding characteristics of, May p. 91
Cast iron, residual stresses in,* July p. 100
standards for classifying graphite in,* Feb. p. 84
Cast iron, wear resistant,* Sept. p. 116
Cast surface finishes, standards for,* Oct. p. 72
Casting machining,* Feb. p. 63
Castings, clamping,* Jan. p. 48
machining of, Oct. p. 58
Cement, use of in restraining titanium, Oct. p. 69
Centerhead, lathe,* Feb. p. 65
Centerless grinding, June p. 65
honing, May p. 67
Ceramics, Stochastic process in,* Mar. p. 105
Chatter, cause and cure, Dec. p. 78
Chatter, damping of, Aug. p. 77
Checking of work during grinding, Dec. p. 78
Chemical blanking, May p. 87
milling, Nov. p. 61
Chip characteristics, effect of cutting fluids,* Dec. p. 135
Chip formation, Mar. p. 99
Chip forming as an extrusion operation, Mar. p. 100
Chip tool contact,* Apr. p. 273
Chipbreaking, kinematic,* Aug. p. 547
Chipping, cracking, fracture in carbide tools, Apr. p. 100
Chuck jaws, trueing of,* July p. 49
Chucking machine, automatic, Oct. p. 57
Circuit manufacture, thin-film, May p. 77
Circuits, microminiature, June p. 71
Clamp, castings,* Jan. p. 48
loading, fasteners, Feb. p. 66
welding,* May p. 66
floating, Apr. p. 116
Class 5 threads, Jan. p. 83
Classification systems, June p. 89
(See also Information Retrieval)
Clearance, a function of temperature, Apr. p. 125
Cold swaging, Nov. p. 57
Column loading of honeycomb, Jan. p. 76
Communications, engineers with management, Jan. p. 45
Compacting press with multiple platens, May p. 74
Compressed air tapping, July p. 60
Computer, control of miniature deep hole drilling, Apr. p. 119
assisted design, Dec. p. 59
indexing systems, June p. 92
programmed press, Sept. p. 57
system 360, June p. 71
Computer techniques, Dec. p. 70
use of in inventory control, Mar. p. 77
use of in management control, Oct. p. 45
Computerized programming, Aug. p. 82
quality control, June p. 78
Constant-pressure turning,* June p. 162
Contact wheel grinding, Mar. p. 110
Continuous automatic machines for vibratory finishing, Aug. p. 75
Contour bushing,* Oct. p. 50
Contour grinding, Apr. p. 113
milling, Apr. p. 113
Control, in-process, June p. 65
Coolant flow improved with modified drill bushing,* Apr. p. 84
Coolants, carbide grinding, June p. 81
Cooling rates, effect of on microstructure, Aug. p. 81
Coordinate indexing, June p. 89
Copper alloy tubes, bending of, Aug. p. 91
Copper alloys, resistance welding of, May p. 91
Copper nickel, welding characteristics, May p. 91
Copper, welding of, Aug. p. 85
Cost comparisons between welding methods, Aug. p. 88
Cost factors in numerical control, Jan. p. 58
Costs, die fabrication, Feb. p. 70
Counting-tube components, Oct. p. 54
Crack propagation,* June p. 167
Crush grading of grinding wheels, Jan. p. 78
Cryogenics, Sept. p. 66
Cryothermal treatment of aluminum forgings, Sept. p. 66
Cutter grinding, dry, June p. 83
Cutting compounds, ion mobility in,* Nov. p. 108
Cutting fluids, June p. 93
effect of on chip characteristics,* Dec. p. 135
Cutting forces,* Aug, p. 544
correlation with microstructure,* Sept. p. 79
Cutting oils, rating of,* Mar. p. 181
Cutting plastics, Mar. p. 102
Cutting tools, abrasive-belt, Mar. p. 110
carbide, Apr. p. 98
fatigue failures of,* Apr. p. 275
Cyanates, in nitriding, Apr. p. 121
Cyanides, in nitriding, Apr. p. 121
Cyaniding, paste compounds for,* Oct. p. 113
Cylinder blocks honed under bridge, Dec. p. 60
Cylinders, thick-walled, formed by expansion process, Dec. p. 67

—D—

D-dies,* Mar. p. 81
Dampers, auxiliary mass, Aug. p. 77
Debossing, Dec. p. 63
Deburring device,* Feb. p. 65
Deep-hole drilling, miniature, Apr. p. 119
Deep-hole gun drilling,* Feb. p. 90
Defects, classes of, Apr. p. 127
Demagnetization, Sept. p. 110
Design, of parts feeder, May p. 67
computer assisted, Dec. p. 59
weld,* Mar. p. 199
Design of cold swaging machine, Nov. p. 58
Dial feeder,* Nov. p. 50
Diameter measurement,* Mar. p. 186
Diamond, effect of in grinding wheel performance,* Aug. p. 556
cleaving, Apr. p. 109
for metal bond,* Aug. p. 556
grinding, June p. 81, Nov. p. 65
grinding of carbide, June p. 81
tooling, Aug. p. 89
wheel economics,* Mar. p. 200
wheel grinding, Apr. p. 93
Diamond wheels,* Mar. p. 199
Die construction, spring dies, Feb. p. 71
Die, layout, scriber for,* Jan. p. 50
machined by numerical control, June p. 85
manually operated,* June p. 70
pressless for short-run piercing,* Jan. p. 50
short-run,* Jan. p. 49
sinking, June p. 85
universal, for short-run draws,* Dec. p. 50
Die design, double right-angle bends,* Jan. p. 49
embossing operatoins, Dec. p. 65
for miniaturization, Oct. p. 53
notch stop,* Nov. p. 50

*Brief article of less than one page.

1964 subject index

Die design (Con't)
part ejection,* Aug. p. 70
shimmy die, Mar. p. 84
trigger stop,* Mar. p. 83
Diecasting, automation of, Sept. p. 53
Diehead mounted on engine lathe,* Dec. p. 51
Diemaking by EDM, Feb. p. 81
Die materials for embossing, Dec. p. 66
Dies, blanking, low-cost, Feb. p. 69
bulging, urethane, June p. 76
embossing, June p. 75
forging, chronicling of,* Nov. p. 109
plastic, Apr. p. 87
straightening, Feb. p. 78
urethane, June p. 73
Differential carriers, machining of, Oct. 61
Diffraction grating technique, improved,* Sept. p. 109
Diffused nitride layers, Apr. p. 121
Diffusion, a cause of tool wear, Apr. p. 99
Diffusion bonding,* May p. 159
chromiding of forging dies,* Nov. p. 109
welding,* Aug. p. 558
Disk grinding, stress-free, Apr. p. 106
Distances measured by laser,* Dec. p. 61
Distortion, elimination of during quenching, May p. 71
Distortion of planer guideways,* May p. 153
Document storage, June p. 89
Drawings, programming from, Oct. p. 65
Drill chucks used as fixture components,* Aug. p. 69
Drill fixture, for close proximity holes,* Jan. p. 48
for hole series,* Oct. p. 50
Drill geometry for malleable iron, June p. 93
Drill press machining of recesses,* Oct. p. 49
Drilling, miniature, deep-hole, Apr. p. 119
deep-hole,* Feb. p. 64
laser, Apr. p. 112
machine, special, Oct. p. 56
malleable iron, June p. 93
numerically controlled, Jan. p. 54, Nov. p. 64
spark,* Nov. p. 126
tough and ductile metals,* Mar. p. 186
Drive, magnetostrictive,* Sept. p. 109
Drive dogs for delicate parts,* July p. 48
Drop-through die, Feb. p. 70
Dual dictionary indexing systems, June p. 91
Ductile superconductors, Sept. p. 49
Dust erosion,* Dec. p. 133
Dynamometer, three-component,* Oct. p. 107

—E—

E system, July p. 67
ECM, process parameters,* Feb. p. 163
tooling and controls,* Sept. p. 139
EDM versus diamond wheel, Apr. p. 93
Edge-notched card indexing systems, June p. 91
Educating of engineers, Apr. p. 81, July p. 45
Elastic deformation of grinding wheels,* Oct. p. 111
Elastic properties of retaining rings, Mar. p. 90
Electric motor ratings,* Oct. p. 135
Electrical discharge machining, Feb. p. 81, Apr. p. 93
Electrical discharge machining in Russia,* Sept. p. 116
(See also EDM)
Electrochemical machining,* Sept. p. 139
(See also ECM)
Electrodeposited metals,* Feb. p. 164
Electrodeposition,* Dec. p. 134
Electroforming of silicone rubber,* Oct. p. 62
Electrolytic diamond grinding,* July p. 100
Electrolytic grinding, Jan. p. 81, Mar. p. 104
Electrolytic machining,* Feb. p. 163
Electromagnetic handling of bolts,* Nov. p. 108
Electromagnetic screw,* Oct. p. 112
Electron beam machining,* Mar. p. 184
Electromechanical burnishing,* Sept. p. 114
Electronic signals, use of for weather maps,* Jan. p. 80
Electronics, molecular, May p. 77
Embossing, Dec. p. 63
Electron beam welding, Apr. p. 291,* Dec. p. 68
Embossing dies, June p. 75
End-discharge machines, July p. 56
Engineering education, Apr. p. 81, July p. 45 Oct. p. 78
Engineering students, Apr. p. 81
Envelope average, July p. 67
Environment control, Oct. p. 76
Epoxy, Apr. p. 87
hones compared with steel hones, Mar. p. 97
use of in surface measurement,* Mar. p. 108
Evaluation phase of value engineering, Feb. p. 62
Expandable indexing, Oct. p. 60
Expansion process forms thick-walled cylinders, Dec. p. 67

*Brief article of less than one page.

Explosive forming, Apr. p. 113, May p. 61
of thin-wall tubing, Sept. p. 59
Explosive welding,* Oct. p. 136
Extrusion of composite steel,* May p. 156
Extrusion of flanges, Dec. p. 56
Extrusion, ultrasonically assisted,* Nov. p. 109

—F—

Fabrication and welding of Type 211 stainless steel, Sept. p. 75
Faceplate fixture,* Mar. p. 82
Failures, fatigue, Nov. p. 71
Fasteners, AQL, Apr. p. 127
Dec. p. 72
automotive,* Dec. p. 133
for aluminized steel, Nov. p. 55
materials for interference fits, Jan. p. 83
plastic,* Aug. p. 557
threaded, Jan. p. 65, Feb. p. 66
Fatigue failures, Nov. p. 71
of cutting tools,* Apr. p. 275
Feedback control,* Jan. p. 157
Feeder design, May p. 67
Feeding, parts, May p. 67, May p. 70
Ferrite, handling and machining of, Aug. p. 89
Ferrous alloys, nitriding of, Apr. p. 121
Finishability, July p. 65
Finishes, aesthetic values of,* Feb. p. 164
Finishing of aluminized steel, Nov. p. 56
Fixture, components, drill chucks,* Aug. p. 69
die-button grinding,* May p. 64
drill, for close proximity holes,* Jan. p. 48
drill, for holes series,* Oct. p. 50
faceplate,* Mar. p. 82
Fixture, handle grip,* June p. 68
indexing, Jan. p. 64
lathe, for eccentric turning,* July p. 48
machining castings, Oct. p. 58
master standard, Jan. p. 63
milling large diameters,* July p. 50
prestressed, for vibration damping,* Sept. p. 51
riveting,* Jan. p. 74
roller chain,* Dec. p. 50
setup for recessing tools, Feb. p. 74
tube welding, Feb. p. 85
turning tenons,* Mar. p. 83
vacuum,* Aug. p. 71
weld, indexing,* May p. 65
welding,* Jan. p. 49 Sept p. 52
Fixturing for abrasive belt grinding, Mar. p. 111
Flange extrusion, Dec. p. 58
Flat bed press embossing, Dec. p. 63
Flip-flop vibratory finishing machine, Aug. p. 73
Floating clamp solve holding problem, Apr. p. 116
Fluidized beds quench high-temperature plasma, May p. 73
Flush-pin gage,* June p. 70
Flycutter design,* Feb. p. 63
Flywheel, adjustable, Jan. p. 62
Foamed materials, May p. 81
Forging dies, diffusion chromiding of,* Nov. p. 109
Forging molten metal,* July p. 101
Forging of seamless cylinders, Apr. p. 103
Forging, parameters for,* May p. 156
Forgings, aluminum, stabilized by cryothermal treatment, Sept. p. 66
Form grinding of carbides, Apr. p. 93
Forming, May p. 81
aluminized steel, Nov. p. 53
blocks, urethane, June p. 75
die machined with skate tool, Apr. p. 113
dies, urethane, June p. 73
explosive, Sept. p. 59
four-slide, Jan. p. 51
low-cost, June p. 73
material, May p. 81
Forming and straightening machines, Italian, Dec. p. 48
Four-slide forming, Jan. p. 51
Four-slide press capacity, calculation of, Nov. p. 67
Friction closing of tubes,* Apr. p. 291
Friction deposition of bronze on steel,* Sept. p. 116
Friction welding,* Aug. p. 548
Friction welding,* Sept. p. 143
Functional analysis in design, Aug. p. 65
Functional gaging, Nov. p. 70

—G—

Gage, air electric, June p. 67
block standards,* Apr. p. 273
flush pin,* June p. 70
for step-drill sharpening,* Nov. p. 48
Gage, pneumatic, universal,* Oct. p. 113
pressure, design of,* Aug. p. 555
size and corner squareness, *Aug. p. 71
Gaging,* Feb. p. 64
automation,* Jan. p. 158
functional, Nov. p. 70
in-process, June p. 65
machines, automatic, performance of, Mar. p. 85
needle bores, Mar. p. 107
with air,* Nov. p. 125
Gas-blown abrasive, May p. 86
Gas metal arc welding, Aug. p. 87
Gas tungsten arc welding, Aug. p. 86
Gear drives, noise propagation by,* Nov. p. 103
Gear hones, selection and use, Mar. p. 97
Gear honing,* July p. 102
Gear honing on gear shaving machines, Mar. p. 98
Gear inspection, a method for,* Sept. p. 113
Gears, transmission, shot peening for, Sept. p. 113
Glass cloth, Apr. p. 87
Graphite, property evaluation of,* Aug. p. 90
Graphite as an aid to superfinishing,* Apr. p. 293
Graphite-tipped punches, Feb. p. 82
Grinders, Italian, Dec. p. 47
Grinding, Apr. p. 93, June p. 81
abrasive belt, Mar. p. 109
centerless, June p. 66
contact wheel, Mar. p. 110
costs, June p. 83
diamond, June p. 81
diamond wheel, Apr. p. 93
diamond wheel economics,* Mar. p. 200
disk, stress free, Apr. p. 106
efficiency, June p. 81
electrolytic, Jan. p. 81, Mar. p. 104, July p. 100
faults, correcting, Dec. p. 77
fixture for ball-nose cutters,* Nov. p. 48
inaccuracies, Dec. p. 77
of boron carbide, July p. 57
of carbide, Apr. p. 93
of ceramics, Nov. p. 65
of die buttons,* May p. 64
of rolls, Sept. p. 65
of steel bonded carbides, Mar. p. 116
parameters, June p. 81
platen, Mar. p. 109
replaced by planing,* June p. 139
surface, wet, June p. 83
tool, Apr. p. 93
wheel performance,* Aug. p. 556
wheel selection, June p. 81
wheels, crush grading of, Jan. p. 78
wheels, elastic deformation of,* Oct. p. 111
Grooves, undulating, machining of, Sept. p. 62
Guideways, hydrostatic,* Aug. p. 543
bonded,* Nov. p. 107
Guidelines to value engineering, Aug. p. 65
Gun drilling, numerically controlled,* Feb. p. 90
Gun tube tooling, Nov. p. 66

—H—

Hand straightening, June p. 71
Handling, parts, May p. 67
Hardness measurements,* Apr. p. 295
Hardness of retaining rings, Mar. p. 90
Hastalloy X, explosive forming of, Sept. p. 61
Heat treatment, alumina,* Jan. p. 157
solution, Apr. p. 71
steel bonded carbides, Mar. p. 115
Helicopter spars, broaching of, Apr. p. 118
Hemispheres, tool-generated, Feb. p. 89
High-production feeding, May p. 70
High-speed metalcutting, Aug. p. 84
High-speed steel, thermomagnetic treatment of,* Nov. p. 109
High-speed steels, Mar. p. 102
High-temperature lubricants,* Feb. p. 98
Hone selection, Mar. p. 98
Hones, gear, Mar. p. 97
Honeycomb, column loading of, Jan. p. 76
use of in plastic tooling, Jan. p. 75
Honing, centerless, May p. 67
gear,* July p. 102
of annular ball tracks, Jan. p. 60
operations, Dec. p. 60
stack, May p. 69
Housing design for precision bearings, Jan. p. 69
Hydraulic expansion, Dec. p. 67
Hydraulic removal of bushings,* July p. 48
Hydroform ventage,* Sept. p. 52
Hydrostatic guideways,* Aug. p. 543

—I—

Indexing, coordinate, June p. 89
expandable, Oct. p. 60
fixtures, Jan. p. 64
machines, Oct. p. 59
pawls, good design for,* Dec. p. 52
systems, June p. 89
toolroom, Sept. p. 56
weld fixture,* May. p. 65
Industrial dynamics,* July p. 109
Industrial management, Apr. p. 81
Industrial production, emergency planning for,* Dec. p. 69
Inert-gas-shielded arc welding of copper, Aug. p. 85
Information phase of value engineering, Feb. p. 62
Information retrieval, June p. 89
In-process control, June p. 65
gaging, June p. 65
Insert tooling, Nov. p. 66
Inspection, gear, a method for,* Sept. p. 113
Inspection of retaining rings, Mar. p. 89
Inventory theory and procurement,* Sept. p. 79
Ion mobility in cutting compounds,* Nov. p. 108
Iron, malleable, drilling, June p. 93
Italian machine tools, Dec. p. 45

—J—

Jig borer, numerically controlled, Jan. p. 54, Jan. p. 72

Job shop, automated, Mar. p. 77

—K—

K-Monel, explosive forming of, Sept. p. 61
Kinematic chipbreaking,* Aug. p. 547

—L—

Laminated plastic tools, Apr. p. 87
Lamination stacks, producing step-lap joints in, Oct. p. 63
Lapping of boron carbide, July p. 59
Lapping setup trues chuck jaws,* July p. 49
Laser, Apr. p. 109
  glass, melting of,* Oct. p. 55
  materials, Apr. p. 110
  technology, Apr. p. 109
Laser light measures distances,* Dec. p. 61
Lathe, bed stiffness,* Apr. p. 276
  centerhead,* Feb. p. 65
  fixture for eccentric turning,* July p. 48
  jaws,* July p. 49
  makes spherical part, May p. 76
  spindle, articulated,* Sept. p. 63
  tool for milling flats,* Niv. p. 49
  turning of punch,* June p. 68
  turret adapted to milling machine,* Mar. p. 81
Launch escape motor,* Feb. p. 96
Leadscrews, precision, nitriding of,* Nov. p. 108
Life Island, Aug. p. 96
Liquid nitrogen quenching, May p. 71
Liquids, locking, Jan. p. 68
Loading limits in threaded fasteners, Feb. p. 67
Locking liquids, Jan. p. 68
Logic circuitry, June p. 71
Lot size, Apr. p. 127
Low-alloy steel,* May p. 80
Low brass, welding characteristics of, May p. 91
Low-cost forming, June p. 73
Low-density foams for nonmetallic tooling, Sept. p. 71
Lubricants for bending of titanium, Apr. p. 91
Lubricants for high temperatures,* Feb. p. 98
Lubrication, mist, for broaching,* July p. 102
Lubrication for interference fits, Jan. p. 84

—M—

MIG welding,* June p. 167
MMC tolerancing, Nov. p. 70
Machinability and machine tools, Aug. p. 77
Machinability test, Aug. p. 78
Machine, arbor removal,* July p. 50
  assurance, Mar. p. 87
  capability, June p. 65
  clamping,* June p. 70
  design for vibratory finishers, July p. 55
  modular design, July p. 63
  noise,* Nov. p. 103
  performance, Mar. p. 87
  prototype, June p. 77
  quality indicator,* Dec. p. 117
  tool design,* May p. 151
  tool standards,* Feb. p. 87
  tools, numerically controlled, positioning of,* Dec. p. 116
  tools, reinforced concrete for,* Apr. p. 291
  tools and machinability, Aug. p. 77
  tube bending, Apr. p. 107
  special, Oct. p. 59
Machining, abrasive,* Sept. p. 140
Machining, arc-air,* Aug. p. 547
  aluminum, effects of temperature variation, Feb. p. 91
  castings, Oct. p. 58
  center, Jan. p. 56, Sept. p. 68
  economics of, Apr. p. 93
  electrical discharge, Apr. p. 93
  electron beams,* Mar. p. 184
  ferrite, Aug. p. 89
  polygons, Aug. p. 79
  precision slits with traveling-wire electrodes, Oct. p. 51
  stresses, Aug. p. 543
  template, June p. 85
  ultrasonic, Mar. p. 105, Nov. p. 126
  without distortion,* Aug. p. 557
Magnesium alloy,* July p. 109
Magnetic assembly,* Mar. p. 186
Magnetostrictive drive,* Sept. p. 109
Maintenance, facilitated by paint, Sept. p. 64
Malleable iron, drilling, June p. 93
Management control, Oct. p. 45
  presentations, Jan. p. 45
Manufacturing, of thin film circuits, May p. 78
  planning, June p. 65
Manufacturing engineering, use of value engineering in, Nov. p. 45
Marking, penetration differentials, July p. 72
Masking technique for thin film circuits, May p. 79
Master standard fixtures, Jan. p. 63
Material, forming, May p. 81
  removal, Mar. p. 99
  selection, Aug. p. 68
Materials, aerospace, testing of,* May p. 90
  for embossing operations, Dec. p. 64
  for superconductors, Sept. p. 48
  modeling, May p. 82
Matrix failures in carbide tools, Apr. p. 100
Measurement accuracy,* May p. 159
Measurement of large diameters,* Mar. p. 186
Measuring torsional vibrations,* Oct. p. 107
Mechanical implementation of indexing systems, June p. 90
Mechanical program unit,* May p. 155
Mechanized welder,* July p. 62
Media for vibratory finishing, Aug. p. 72
Medical engineering, Aug. p. 96
Metal, molten, forging,* July p. 101
Metal bond,* Aug. p. 556
Metal forming, May p. 81
Metal from metallocenes,* May p. 83
Metalcutting, high-speed, Aug. p. 84
Metallocenes, pure metal from,* May p. 83
Metallurgy, Stochastic process,* Mar. p. 105
Microcircuits, thin film, May p. 77
Microdrilling, Apr. p. 119
Microelectronic modules, June p. 71
Microelectronics, May p. 77
Micromachining, Apr. p. 109
Microminiature circuits, June p. 71
Microminiature parts, electrolytic grinding of, Jan. p. 81
Microstructure of steel, Aug. p. 80
Microwelding, Apr. p. 109
Milling, rack,* Sept. p. 51
Milling of shotgun cam slots, Dec. p. 71
Miniaturized parts produced by progressive dies, Oct. p. 53
Mist lubrication for broaching,* July p. 102
Missile rings machined with radial drill,* May p. 75
Modeling materials, May p. 82
Modified drill bushing,* Apr. p. 84
Modular design machine, July p. 63
Modules, microelectronic, June p. 71
Molecular electronics, May p. 77
Muntz metal, welding characteristics, of, May p. 91

—N—

NAMDA, Oct. p. 45
Network analysis in multiple and dissimilar applications, Oct. p. 45
Nickel plating of austenitic steels,* Oct. p. 112
Nitride layers, diffused, Apr. p. 121
Nitridgin,* Nov. p. 108
Nitriding, salt-bath, Apr. p. 121
  ultrasonic,* Apr. p. 276
Nondestructive testing,* Oct. p. 64
Nonmetallic tooling, Sept. p. 71
Notch stop for progressive die,* Nov. p. 50
Numerical control, Jan. p. 53, June p. 85
  building-block systems, Jan. p. 59; Dec. p. 70
  cost factors in, Jan. p. 58
  equipment selection, Jan. p. 58
  in die machining, June p. 85
  in short-run production, Oct. p. 71
  Italian, Dec. p. 45
  jig boring, Jan. p. 72
  machining areas, Jan. p. 58
  programming from undimensioned drawings, Oct. p. 65
  retrofitting, Jan. p. 58
  tooling for, Jan. p. 58
  training of personnel, Jan. p. 57
Numerically controlled bending machine, Feb. p. 75
  drilling, Jan. p. 54, Nov. p. 64
  gun drilling,* Feb. p. 90
  machine tools, positioning of, Dec. p. 116
  machines, servos for,* Apr. p. 295
  tool changing, Jan. p. 54
  transfer machine, Jan. p. 57
  turning,* July p. 99

—O—

Off-center machining,* Aug. p. 70
Olecranon screws, Feb. p. 97
Optical-coincidence cards, June p. 89
Optical line following, Feb. p. 81
Override, use of in numerically controlled machining, Jan. p. 54

—P—

PERT, Oct. p. 47
PM interfaces, June p. 78
PRONTO programming system, Sept. p. 57
Paint, use of in assembly and maintenance, Sept. p. 64
Pan heads, July p. 71
Parallels, holding in position,* Nov. p. 48
Parameters for forging,* May p. 156
Parts feeding, May p. 67
Parts handling in vibratory finishing, Aug. p. 74
Paste compounds for cyaniding,* Oct. p. 113
Pattern making with RTV silicone rubber, July p. 69
Peeling machines for bar stock,* Oct. p. 108
Penetration differentials in marking, July p. 72
Photoetch technique for thin film circuits, May p. 79
Physical constants, new values for,* Apr. p. 112
Piercing, cam actuated, Dec. p. 57
Pipe-tube connectors, Oct. p. 73
Planer guideways, distortion of, May p. 153
Planing replaces grinding,* June p. 139
Plasma, quenching of, May p. 73
Plastic, deformation in carbide tools, Apr. p. 100
  dies, Apr. p. 87
  fasteners,* Aug. p. 557
  models for time study,* Mar. p. 182
  tooling spray layup of, Apr. p. 87
Plastic, cutting, Mar. p. 102 tooling, Apr. p. 87
Platen grinding, Mar. p. 109
Polishing of nonmagnetic materials,* Mar. p. 186
Polishing semiconductors, Mar. p. 102
Polygons, machining, Aug. p. 79
Postgraduate training, Apr. p. 81
Potted fixture details, Feb. p. 87
Precision bearings, tolerances for, Jan. p. 69
Preheating for welding, Aug. p. 87
Press construction, p. 293,* May p. 155*
Press fits with plated components,* June p. 140
Press tooling, June p. 74
  compacting, with multiple platens, May p. 74
  deformation,* Mar. p. 183
Presses, eccentric, May p. 82
Pressure gage, design of,* Aug. p. 555
Pressure testing, Feb. p. 77
Pressure vessels, construction of, Dec. p. 67
Pressure vessels, welding of, Dec. p. 68
Pressworking, brakes operating in tandem,* Mar. p. 108
  calculation of press capacity, Nov. p. 67
  computer programmed, Sept. p. 57
  missing parts detector, Mar. p. 94
  progressive die design, Oct. p. 53
Prestressed fixture,* Sept. p. 51
Probability and machine tool design,* May p 151
Process selection, Aug. p. 68
Procurement and inventory theory,* Sept. p. 79
Production, die, Apr. p. 113
  industrial, emergency planning for,* Dec. p. 69
  short-run, use of numerical control, Oct. p. 71
  welding,* June p. 167
Program planning phase of value engineering, Feb. p. 62
Progressive die, short-run,* Jan. p. 49
  for miniaturized parts, Oct. p. 53
  notch stop for,* Nov. p. 50
  die spring, Feb. p. 70
Projection welding,* Oct. p. 113
Prosthetic surgery, Aug. p. 96
Punch fabrication for EDM, Feb. p. 82
Punched card indexing systems, June p. 91
Punching, rubber,* Sept. p. 79

—Q—

Quality control by computer, June p. 78
Quality levels, Apr. p. 127
Quenching, with fluidized beds,* May p. 73
Quenching with liquid nitrogen, May p. 71

—R—

RTV silicone rubber patterns, July p. 69
Rack milling,* Sept. p. 51
Radial drill machines missile rings,* May p. 75
Radiography,* Oct. p. 64
Ratcheting tapholder,* Mar. p. 82
Razor-blade punches, Oct. p. 53
Reamer protective device,* Apr. p. 84
Reamer sizing,* Mar. p. 83
Recesses machined on drill press,* Oct. p. 49
Recessing tools, setup for, Feb. p. 74
Red brass, welding characteristics of, May p. 91
Reflected roughness, July p. 66
Reflex press, May p. 74
Refractory zirconia for aerospace,* Mar. p. 88
Reinforced concrete for machine tools,* Apr. p. 291
Reliability, soldering, June p. 88
Report writing, Sept. p. 73
Reporting phase of value engineering, Feb. p. 62
Research into environment control, Oct. p. 76
Research, staying competitive through, Sept. p. 79
Research, turning,* Mar. p. 182
Residual stresses in cast iron,* July p. 100
Resin-bonded bearings,* Apr. p. 271
Resin-bonded diamond wheels, testing of,* Mar. p. 199
Resistance welding, June p. 140,* Sept. p. 116
Resistance welding of copper alloys, May p. 91
Retaining rings, evaluation and inspection of, Mar. p. 89
Retrofitting for numerical control, Jan. p. 58
Rifle barrels, cold swaging of, Nov. p. 60
Ring machines, July p. 56
Riveting fixture,* Jan. p. 74
Rivets, Dec. p. 72
Roll forming on a drill press,* June p. 69
Roll grinder, Sept. p. 65
Rolling vs. turning,* May p. 155
Rolls turned on NC lathe,* July p. 99
Root design of threaded fasteners, Jan. p. 65
Rotary press embossing, Dec. p. 63
Roughness, reflected, July p. 66
Roughness topology, July p. 68
Rubber inserter,* Aug. p. 69

—S—

Salt-bath nitriding, Apr. p. 121
Sample size for AQLs, Apr. p. 127
Saturn missile, fuel lines, Feb. p. 77
Saturn missile fabrication, May p. 61
Scrap, use of in steel manufacture,* Jan. p. 71
Scratching of work during grinding, Dec. p. 78

*Brief article of less than one page.

Screw, electromagnetic,* Oct. p. 112
Screw machine story,* June p. 84
Screwdriver adapter,* Feb. p. 65
Screws, olecranon, Feb. p. 97
tapered, thread milling of, Feb. p. 97
Scriber, adjustable,* Jan. p. 50
Seizure, a cause of tool wear, Apr. p. 98
Self-excited vibration, Aug. p. 77
Semiconductors, polishing of, Mar. p. 102
Separation roughness, July p. 66
Servos for numerically controlled machines,* Apr. p. 295
Setup fixture for recessing tools, Feb. p. 74
Setup stop,* Apr. p. 84
Shaft advance, controlled,* Oct. p. 50
Shaft design for precision bearings, Jan. p. 69
Shear-forming machine, Feb. p. 77
Shear operations, hydraulic, Feb. p. 88
Shears, billet, Italian, Dec. p. 48
Sheet and tubing, aluminized steel, Nov. p. 56
Sheet metal, aluminum, Apr. p. 71
Sheet metal rolling with urethane,* Sept. p. 63
Shimmy die, Mar. p. 84
Shot peening for car transmission gears,* Sept. p. 113
Silicon brass, welding characteristics of, May p. 91
Silicone rubber, electroforming on,* Oct. p. 62
Sine plate, special,* Feb. p. 63
Skate tool, Apr. p. 113
Slits, machining of, Oct. p. 51
Small lot production,* May p. 64
Solder for brazing aluminum,* June p. 139
Soldering reliability, June p. 88
Solution systems for vibratory finishing, Aug. p. 72
Space Age materials, drilling of, Apr. p. 119
Space Age tooling, July p. 51
Spark drilling,* Nov. p. 126
Special bushing for removing milling machine arbors,* July p. 50
Special drilling machine, Oct. p. 56
Special machine, construction of, Nov. p. 51
Special machines, June p. 77, Oct. p. 59
Special shapes, bending of, Apr. p. 107
Speed changer, roller type, June p. 80
Speed drives, adjustable,* Aug. p. 555
Spherical part produced on standard lathe, May p. 76
Spinning operations, Apr. p. 102
Spiral automatic machines for vibratory finishing, Aug. p. 75
Spirals caused by grinding, Dec. p. 77
Spray layup of plastic tooling, Apr. p. 87
Spraying steel, thermomechanical treatment for,* Sept. p. 114
Spring die, Feb. p. 69
Spring winder,* Dec. p. 52
Springback, correction of in bending machines, Feb. p. 75
Spring, oval, manufacture of,* Sept. p. 51
Spring winder for prototype work,* Apr. p. 86
Stack honing, May p. 69
Stacked broaches,* Oct. p. 49
Stainless tubing, Oct. p. 74
Stamping-straightening machine, Feb. p. 78
Standards, for cast surface finishes,* Oct. p. 72
for gage blocks,* Apr. p. 273
for graphite in cast iron,* Feb. p. 84
machine tool,* Feb. p. 87
Stapler, multihead,* Feb. p. 90
Statistical control methods engaging, Mar. p. 86
Steel, AISI 4130, Aug. p. 67
AISI 4140 hot-rolled, Aug. p. 67
AISI 4340 hot-rolled, Aug. p. 67
AISI 4615 hot-rolled, Aug. p. 67
AISI 6150 hot-rolled, Aug. p. 67
B1112 cold-rolled, Aug. p. 67
C1018 cold-rolled, Aug. p. 67
C1040 hot-rolled, Aug. p. 67
C1045 hot-rolled, Aug. p. 67
C1117 cold-rolled, Aug. p. 67
C1141 hot-rolled, Aug. p. 67
aluminized, Nov. p. 52
bonded carbides, Mar. p. 115
carbon, nitriding of, Apr. p. 121
composite, extrusion of,* May p. 156
forgings, machining of, Feb. p. 89
high-speed, thermomagnetic treatment of,* Nov. p. 109
hones compared with epoxy hones, Mar. p. 97
low-alloy,* May p. 80
manufacture from scrap,* Jan. p. 71
microstructure and strength of, Aug. p. 80
selection chart, Aug. p. 67
stainless, type 211, Sept. p. 75
Steels, austenitic, nickel plating of,* Oct. p. 112
Steels, high-speed, Mar. p. 102
mild, nitriding of, Apr. p. 121
unalloyed, machinability studies of, Mar. p. 103
use of in constructing pressure vessels, Dec. p. 67
Step-drill sharpening, gage for,* Nov. p. 48
Step-lap joints in lamination stacks, Oct. p. 63
Stochastic process, in ceramics,* Mar. p. 105
in metallurgy,* Mar. p. 105
Stock removal capability of abrasive belt grinding Mar. p. 112
Straightening dies, Feb. p. 78
Strain wire, knotting device for,* Apr. p. 85
Stress raisers, cause of parts failure, Nov. p. 71
Stresses, concentrations of in thread roots, Jan. p. 67
distribution of in honeycomb, Jan. p. 76
machining, Aug. p. 543
Stretch die produced by spray layup, Apr. p. 89
Stretch forming, May p. 61
Stripping pads, urethane, June p. 75
Superconductors, applications of, Sept. p. 49
Superfinishing, graphite aided,* Apr. p. 293
Superfinishing with increased oscillation frequency,* June p. 139
Surface characteristics, July p. 67
Surface finish, produced by cold swaging, Nov. p. 58
Surface finishes, July p. 65
Surface grinding, wet, June p. 83
Surface quality of retaining rings, Mar. p. 91
Surface topology, July p. 65
System/360, June p. 71

—T—

Tap breakage, reducing,* Mar. p. 82
Tap relief,* Mar. p. 181
Tap resetter increases efficiency of bar automatic, Mar. p. 96
Tape preparation, Sept. p. 57
Tapered screws, thread milling of, Feb. p. 97
Tapping, application of dimensional analysis to, Mar. p. 101
compressed air, July p. 60
machine designed for torque control, Mar. p. 95
Technological potential, nation's,* June p. 76
Temperature effects on clearance, Apr. p. 125
measurement,* Sept. p. 50
variations, effect of in machining aluminum, Feb. p. 91
Temperatures for bending of titanium, Apr. p. 91
Template machining, June p. 85
Templates, use of in chemical milling, Nov. p. 62
Tenon turning,* Mar. p. 83
Testing, automatic,* Oct. p. 135
Testing, bolts,* Sept. p. 139
carbide tools,* June p. 157; Aug. p. 544
nondestructive,* Oct. p. 64
Thermionic converters, Dec. p. 73
Thermocompression bonding,* May p. 159
Thermomagnetic treatment of high-speed steel,* Nov. p. 109
Thin film microcircuits, May p. 77
Thin-wall tubing, Sept. p. 59
Thread milling of tapered screws, Feb. p. 97
Threaded fasteners, Jan. p. 65, Feb. p. 66
Threads, class 5, Jan. p. 83
Three-component dynamometer,* Oct. p. 107
Time study, plastic models for,* Mar. p. 182
Titanium, bending, of, Apr. p. 90
restrained by cement, Oct. p. 69
welding, June p. 168, Aug. p. 83*
Toggle mechanism for cutting sheet stock,* June p. 69
Tolerances, manufacturing, June p. 65
cost of, Aug. p. 68
precision bearings, Jan. p. 69
Tonnage ratings in presses, Nov. p. 67
Tonnage requirements in embossing operations, Dec. p. 64
Tool, changing, numerically controlled, Jan. p. 54
design for titanium tube bending, Apr. p. 90
grinding, Apr. p. 93
life, Apr. p. 98, June p. 158,* Aug. p. 78
marks, eliminated by cam rider,* May p. 66
materials, Apr. p. 98
performance, effect of carbides on, Apr. p. 98
Tooling, assembly, Apr. p. 96
balls, Feb. p. 86
controls, ECM,* Sept. p. 139
diamond, Aug. p. 89
for numerical control, Jan. p. 58
for the Saturn, July p. 51
for thermionic converters, Dec. p. 75
gun tube, Nov. p. 66
nonmetallic, Sept. p. 71
plastic, use of honeycomb, Jan. p. 75
plastics, Apr. p. 87
press brake, June p. 74
special, Apr. p. 107
Toolroom indexing table, Sept. p. 56
Tools, urethane, June p. 73
Torque sensing device, Feb. p. 76
Torque-tension control in threaded fasteners, Feb. p. 67
Torsional vibrations, measuring of,* Oct. p. 107
Toughness of adhesive joints,* Apr. p. 297
Tracer control increases production, Apr. p. 105
Tracer machine, use of in optical line following, Feb. p. 83
Training numerical control, Jan. p. 57
Transfer dies, Dec. p. 55
Transfer jig,* May p. 64
Transfer machine, numerically controlled, Jan. p. 57
machines, Italian, Dec. p. 46
design of, Oct. p. 61
punch fits different holes,* Dec. p. 51
Transistors, assembly machine for, Apr. p. 96
Traveling-wire electrode, Oct. p. 51
Trepanning tool,* Jan. p. 74
Trigger stop,* Mar. p. 83
Tube bending, July p. 63, Aug. p. 91, Oct. p. 70
machine, Apr. p. 107
numerically controlled, Feb. p. 75
titanium, Apr. p. 90
Tube welding fixture, Feb. p. 85
Tubes, friction closing of,* Apr. p. 291
Tubing, stainless, Oct. p. 74
Tubular components, cold swaging of, Nov. p. 57
Turbine-generators, machining of, Sept. p. 68
Turning, constant pressure,* June p. 162
Turning forces, feed and radial,* Oct. p. 111
Turning research,* Mar. p. 182
Turning vs. rolling,* May p. 155
Type 211 stainless steel, Sept. p. 75

—U—

Ultrasonic aging,* May p. 154
Ultrasonic machining, Mar. p. 105, Nov. p. 126*
Ultrasonic nitriding,* Apr. p. 276
Ultrasonic welding,* Apr. p. 293
Ultrasonically assisted extrusion,* Nov. p. 109
Uultrasound and grain size,* May p. 156
Universal pneumatic gage,* Oct. p. 113
Urethane, June p. 73
die components, June p. 73
foams, Sept. p. 71
plastics, Apr. p. 89
tools, June p. 73
use of in rolling sheet metal,* Sept. p. 63

—V—

V-block design,* Aug. p. 70
V-block fixture for central holes,* Apr. p. 86
VE, training for manufacturing, Nov. p. 45
Vacuum bag curing, Apr. p. 89
Vacuum chamber tests aerospace materials,* May p. 90
Vacuum fixture,* Aug. p. 71
Value analysis,* Aug. p. 88
Value engineering, Feb. p. 61, Aug. p. 65, Nov. p. 45
Vapor deposition,* Aug. p. 558
Vibration, boring-bar,* Sept. p. 112
self-excited, Aug. p. 77
Vibratory finishing, July p. 53, Aug. p. 72
equipment selection guidelines, Aug. p. 76
Visioplasticity, May p. 81

—W—

Wear resistance, boron-carbide-imparted, July p. 58
Wear resistant cast iron,* Sept. p. 116
Weld design,* Mar. p. 199
Weld fixture, indexing,* May p. 65
Weldability, effect of degree of alloying,* Apr. p. 124
Welded structures, inflatable,* Mar. p. 186
Welding, a cause of tool wear, Apr. p. 99
aluminized steel, Nov. p. 53
and fabrication of type 211 stainless steel, Sept. p. 75
arc, June p. 77, Aug. p. 85
automatic arc, May p. 84
butt, May p. 91
cast iron to steel,* June p. 140
clamp,* May p. 66
diffusion,* Aug. p. 558
electron beam,* Apr. p. 291
explosive,* May p. 159, Oct. p. 136
fixture,* Jan. p. 49, Sept. p. 52
friction,* Sept. p. 143; Aug. p. 548*
gas metal arc, Aug. p. 87
gas tungsten arc, Aug. p. 86
high-frequency resistance,* May p. 159
laser, Apr. p. 112
mechanized,* July p. 62
of copper, Aug. p. 85
of thermionic converters, Dec. p. 76
processes, unusual,* May p. 159
production,* June p. 167
projection,* Oct. p. 113
resistance, adaptive control for,* Sept. p. 116
resistance, copper alloys, May p. 91
speeds construction of special machine, Nov. p. 51
steel to cast iron,* June p. 140
TIG, Mar. p. 106
titanium,* June p. 168, Aug. p. 83*
ultrasonic,* May p. 159; Apr. p. 293*
Wheel breakage, cause and cure, Dec. p. 77
Wheel glazing, cause and cure, Dec. p. 77
Wheel grading effect, cause and cure, Dec. p. 78
Wheel loading, cause and cure, Dec. p. 78
Wheel wear, effect of overcorrection, June p. 66
Wire brushing machine, Apr. p. 104
Writing reports, Sept. p. 73

—Y-Z—

Yellow brass, welding characteristics of, May p. 91
Zinc diecasting, Sept. p. 53

*Brief article of less than one page.